**1) SQL Server Data Types**

String Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| **Data type** | **Description** | **Max size** | **Storage** |
| char(n) | Fixed width character string | 8,000 characters | Defined width |
| varchar(n) | Variable width character string | 8,000 characters | 2 bytes + number of chars |
| varchar(max) | Variable width character string | 1,073,741,824 characters | 2 bytes + number of chars |
| text | Variable width character string | 2GB of text data | 4 bytes + number of chars |
| nchar | Fixed width Unicode string | 4,000 characters | Defined width x 2 |
| nvarchar | Variable width Unicode string | 4,000 characters |  |
| nvarchar(max) | Variable width Unicode string | 536,870,912 characters |  |
| ntext | Variable width Unicode string | 2GB of text data |  |
| binary(n) | Fixed width binary string | 8,000 bytes |  |
| varbinary | Variable width binary string | 8,000 bytes |  |
| varbinary(max) | Variable width binary string | 2GB |  |
| image | Variable width binary string | 2GB |  |

Numeric Data Types

|  |  |  |
| --- | --- | --- |
| **Data type** | **Description** | **Storage** |
| bit | Integer that can be 0, 1, or NULL |  |
| tinyint | Allows whole numbers from 0 to 255 | 1 byte |
| smallint | Allows whole numbers between -32,768 and 32,767 | 2 bytes |
| int | Allows whole numbers between -2,147,483,648 and 2,147,483,647 | 4 bytes |
| bigint | Allows whole numbers between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807 | 8 bytes |
| decimal(p,s) | Fixed precision and scale numbers.  Allows numbers from -10^38 +1 to 10^38 –1.  The p parameter indicates the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.  The s parameter indicates the maximum number of digits stored to the right of the decimal point. s must be a value from 0 to p. Default value is 0 | 5-17 bytes |
| numeric(p,s) | Fixed precision and scale numbers.  Allows numbers from -10^38 +1 to 10^38 –1.  The p parameter indicates the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.  The s parameter indicates the maximum number of digits stored to the right of the decimal point. s must be a value from 0 to p. Default value is 0 | 5-17 bytes |
| smallmoney | Monetary data from -214,748.3648 to 214,748.3647 | 4 bytes |
| money | Monetary data from -922,337,203,685,477.5808 to 922,337,203,685,477.5807 | 8 bytes |
| float(n) | Floating precision number data from -1.79E + 308 to 1.79E + 308.  The n parameter indicates whether the field should hold 4 or 8 bytes. float(24) holds a 4-byte field and float(53) holds an 8-byte field. Default value of n is 53. | 4 or 8 bytes |
| real | Floating precision number data from -3.40E + 38 to 3.40E + 38 | 4 bytes |

## 2) SQL Keywords

|  |  |
| --- | --- |
| **Keyword** | **Description** |
| [ADD](https://www.w3schools.com/sql/sql_ref_add.asp) | Adds a column in an existing table |
| [ADD CONSTRAINT](https://www.w3schools.com/sql/sql_ref_add_constraint.asp) | Adds a constraint after a table is already created |
| [ALL](https://www.w3schools.com/sql/sql_ref_all.asp) | Returns true if all of the subquery values meet the condition |
| [ALTER](https://www.w3schools.com/sql/sql_ref_alter.asp) | Adds, deletes, or modifies columns in a table, or changes the data type of a column in a table |
| [ALTER COLUMN](https://www.w3schools.com/sql/sql_ref_alter_column.asp) | Changes the data type of a column in a table |
| [ALTER TABLE](https://www.w3schools.com/sql/sql_ref_alter_table.asp) | Adds, deletes, or modifies columns in a table |
| [AND](https://www.w3schools.com/sql/sql_ref_and.asp) | Only includes rows where both conditions is true |
| [ANY](https://www.w3schools.com/sql/sql_ref_any.asp) | Returns true if any of the subquery values meet the condition |
| [AS](https://www.w3schools.com/sql/sql_ref_as.asp) | Renames a column or table with an alias |
| [ASC](https://www.w3schools.com/sql/sql_ref_asc.asp) | Sorts the result set in ascending order |
| [BACKUP DATABASE](https://www.w3schools.com/sql/sql_ref_backup_database.asp) | Creates a back up of an existing database |
| [BETWEEN](https://www.w3schools.com/sql/sql_ref_between.asp) | Selects values within a given range |
| [CASE](https://www.w3schools.com/sql/sql_ref_case.asp) | Creates different outputs based on conditions |
| [CHECK](https://www.w3schools.com/sql/sql_ref_check.asp) | A constraint that limits the value that can be placed in a column |
| [COLUMN](https://www.w3schools.com/sql/sql_ref_column.asp) | Changes the data type of a column or deletes a column in a table |
| [CONSTRAINT](https://www.w3schools.com/sql/sql_ref_constraint.asp) | Adds or deletes a constraint |
| [CREATE](https://www.w3schools.com/sql/sql_ref_create.asp) | Creates a database, index, view, table, or procedure |
| [CREATE DATABASE](https://www.w3schools.com/sql/sql_ref_create_database.asp) | Creates a new SQL database |
| [CREATE INDEX](https://www.w3schools.com/sql/sql_ref_create_index.asp) | Creates an index on a table (allows duplicate values) |
| [CREATE OR REPLACE VIEW](https://www.w3schools.com/sql/sql_ref_create_or_replace_view.asp) | Updates a view |
| [CREATE TABLE](https://www.w3schools.com/sql/sql_ref_create_table.asp) | Creates a new table in the database |
| [CREATE PROCEDURE](https://www.w3schools.com/sql/sql_ref_create_procedure.asp) | Creates a stored procedure |
| [CREATE UNIQUE INDEX](https://www.w3schools.com/sql/sql_ref_create_unique_index.asp) | Creates a unique index on a table (no duplicate values) |
| [CREATE VIEW](https://www.w3schools.com/sql/sql_ref_create_view.asp) | Creates a view based on the result set of a SELECT statement |
| [DATABASE](https://www.w3schools.com/sql/sql_ref_database.asp) | Creates or deletes an SQL database |
| [DEFAULT](https://www.w3schools.com/sql/sql_ref_default.asp) | A constraint that provides a default value for a column |
| [DELETE](https://www.w3schools.com/sql/sql_ref_delete.asp) | Deletes rows from a table |
| [DESC](https://www.w3schools.com/sql/sql_ref_desc.asp) | Sorts the result set in descending order |
| [DISTINCT](https://www.w3schools.com/sql/sql_ref_distinct.asp) | Selects only distinct (different) values |
| [DROP](https://www.w3schools.com/sql/sql_ref_drop.asp) | Deletes a column, constraint, database, index, table, or view |
| [DROP COLUMN](https://www.w3schools.com/sql/sql_ref_drop_column.asp) | Deletes a column in a table |
| [DROP CONSTRAINT](https://www.w3schools.com/sql/sql_ref_drop_constraint.asp) | Deletes a UNIQUE, PRIMARY KEY, FOREIGN KEY, or CHECK constraint |
| [DROP DATABASE](https://www.w3schools.com/sql/sql_ref_drop_database.asp) | Deletes an existing SQL database |
| [DROP DEFAULT](https://www.w3schools.com/sql/sql_ref_drop_default.asp) | Deletes a DEFAULT constraint |
| [DROP INDEX](https://www.w3schools.com/sql/sql_ref_drop_index.asp) | Deletes an index in a table |
| [DROP TABLE](https://www.w3schools.com/sql/sql_ref_drop_table.asp) | Deletes an existing table in the database |
| [DROP VIEW](https://www.w3schools.com/sql/sql_ref_drop_view.asp) | Deletes a view |
| [EXEC](https://www.w3schools.com/sql/sql_ref_exec.asp) | Executes a stored procedure |
| [EXISTS](https://www.w3schools.com/sql/sql_ref_exists.asp) | Tests for the existence of any record in a subquery |
| [FOREIGN KEY](https://www.w3schools.com/sql/sql_ref_foreign_key.asp) | A constraint that is a key used to link two tables together |
| [FROM](https://www.w3schools.com/sql/sql_ref_from.asp) | Specifies which table to select or delete data from |
| [FULL OUTER JOIN](https://www.w3schools.com/sql/sql_ref_full_outer_join.asp) | Returns all rows when there is a match in either left table or right table |
| [GROUP BY](https://www.w3schools.com/sql/sql_ref_group_by.asp) | Groups the result set (used with aggregate functions: COUNT, MAX, MIN, SUM, AVG) |
| [HAVING](https://www.w3schools.com/sql/sql_ref_having.asp) | Used instead of WHERE with aggregate functions |
| [IN](https://www.w3schools.com/sql/sql_ref_in.asp) | Allows you to specify multiple values in a WHERE clause |
| [INDEX](https://www.w3schools.com/sql/sql_ref_index.asp) | Creates or deletes an index in a table |
| [INNER JOIN](https://www.w3schools.com/sql/sql_ref_inner_join.asp) | Returns rows that have matching values in both tables |
| [INSERT INTO](https://www.w3schools.com/sql/sql_ref_insert_into.asp) | Inserts new rows in a table |
| [INSERT INTO SELECT](https://www.w3schools.com/sql/sql_ref_insert_into_select.asp) | Copies data from one table into another table |
| [IS NULL](https://www.w3schools.com/sql/sql_ref_is_null.asp) | Tests for empty values |
| [IS NOT NULL](https://www.w3schools.com/sql/sql_ref_is_not_null.asp) | Tests for non-empty values |
| [JOIN](https://www.w3schools.com/sql/sql_ref_join.asp) | Joins tables |
| [LEFT JOIN](https://www.w3schools.com/sql/sql_ref_left_join.asp) | Returns all rows from the left table, and the matching rows from the right table |
| [LIKE](https://www.w3schools.com/sql/sql_ref_like.asp) | Searches for a specified pattern in a column |
| [LIMIT](https://www.w3schools.com/sql/sql_ref_limit.asp) | Specifies the number of records to return in the result set |
| [NOT](https://www.w3schools.com/sql/sql_ref_not.asp) | Only includes rows where a condition is not true |
| [NOT NULL](https://www.w3schools.com/sql/sql_ref_not_null.asp) | A constraint that enforces a column to not accept NULL values |
| [OR](https://www.w3schools.com/sql/sql_ref_or.asp) | Includes rows where either condition is true |
| [ORDER BY](https://www.w3schools.com/sql/sql_ref_order_by.asp) | Sorts the result set in ascending or descending order |
| [OUTER JOIN](https://www.w3schools.com/sql/sql_ref_outer_join.asp) | Returns all rows when there is a match in either left table or right table |
| [PRIMARY KEY](https://www.w3schools.com/sql/sql_ref_primary_key.asp) | A constraint that uniquely identifies each record in a database table |
| [PROCEDURE](https://www.w3schools.com/sql/sql_ref_procedure.asp) | A stored procedure |
| [RIGHT JOIN](https://www.w3schools.com/sql/sql_ref_right_join.asp) | Returns all rows from the right table, and the matching rows from the left table |
| [ROWNUM](https://www.w3schools.com/sql/sql_ref_rownum.asp) | Specifies the number of records to return in the result set |
| [SELECT](https://www.w3schools.com/sql/sql_ref_select.asp) | Selects data from a database |
| [SELECT DISTINCT](https://www.w3schools.com/sql/sql_ref_select_distinct.asp) | Selects only distinct (different) values |
| [SELECT INTO](https://www.w3schools.com/sql/sql_ref_select_into.asp) | Copies data from one table into a new table |
| [SELECT TOP](https://www.w3schools.com/sql/sql_ref_select_top.asp) | Specifies the number of records to return in the result set |
| [SET](https://www.w3schools.com/sql/sql_ref_set.asp) | Specifies which columns and values that should be updated in a table |
| [TABLE](https://www.w3schools.com/sql/sql_ref_table.asp) | Creates a table, or adds, deletes, or modifies columns in a table, or deletes a table or data inside a table |
| [TOP](https://www.w3schools.com/sql/sql_ref_top.asp) | Specifies the number of records to return in the result set |
| [TRUNCATE TABLE](https://www.w3schools.com/sql/sql_ref_truncate_table.asp) | Deletes the data inside a table, but not the table itself |
| [UNION](https://www.w3schools.com/sql/sql_ref_union.asp) | Combines the result set of two or more SELECT statements (only distinct values) |
| [UNION ALL](https://www.w3schools.com/sql/sql_ref_union_all.asp) | Combines the result set of two or more SELECT statements (allows duplicate values) |
| [UNIQUE](https://www.w3schools.com/sql/sql_ref_unique.asp) | A constraint that ensures that all values in a column are unique |
| [UPDATE](https://www.w3schools.com/sql/sql_ref_update.asp) | Updates existing rows in a table |
| [VALUES](https://www.w3schools.com/sql/sql_ref_values.asp) | Specifies the values of an INSERT INTO statement |
| [VIEW](https://www.w3schools.com/sql/sql_ref_view.asp) | Creates, updates, or deletes a view |
| [WHERE](https://www.w3schools.com/sql/sql_ref_where.asp) | Filters a result set to include only records that fulfill a specified condition |

# **3) SQL Operators**

## SQL Arithmetic Operators

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| + | Add | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_add) |
| - | Subtract | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_subtract) |
| \* | Multiply | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_multiply) |
| / | Divide | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_divide) |
| % | Modulo | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_modulo) |

## SQL Bitwise Operators

|  |  |
| --- | --- |
| **Operator** | **Description** |
| & | Bitwise AND |
| | | Bitwise OR |
| ^ | Bitwise exclusive OR |

## SQL Comparison Operators

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| = | Equal to | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_equal_to) |
| > | Greater than | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_greater_than) |
| < | Less than | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_less_than) |
| >= | Greater than or equal to | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_greater_than2) |
| <= | Less than or equal to | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_less_than2) |
| <> | Not equal to | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_not_equal_to) |

## SQL Compound Operators

|  |  |
| --- | --- |
| **Operator** | **Description** |
| += | Add equals |
| -= | Subtract equals |
| \*= | Multiply equals |
| /= | Divide equals |
| %= | Modulo equals |
| &= | Bitwise AND equals |
| ^-= | Bitwise exclusive equals |
| |\*= | Bitwise OR equals |

## SQL Logical Operators

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| ALL | TRUE if all of the subquery values meet the condition | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_all&ss=-1) |
| AND | TRUE if all the conditions separated by AND is TRUE | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_and) |
| ANY | TRUE if any of the subquery values meet the condition | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_any&ss=-1) |
| BETWEEN | TRUE if the operand is within the range of comparisons | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_between) |
| EXISTS | TRUE if the subquery returns one or more records | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_exists) |
| IN | TRUE if the operand is equal to one of a list of expressions | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_in) |
| LIKE | TRUE if the operand matches a pattern | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_like) |
| NOT | Displays a record if the condition(s) is NOT TRUE | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_not) |
| OR | TRUE if any of the conditions separated by OR is TRUE | [Try it](https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_or) |
| SOME | TRUE if any of the subquery values meet the condition |  |

# **4) SQL Server Functions**

SQL Server has many built-in functions.

This reference contains string, numeric, date, conversion, and some advanced functions in SQL Server.

## SQL Server String Functions

|  |  |
| --- | --- |
| **Function** | **Description** |
| [ASCII](https://www.w3schools.com/sql/func_sqlserver_ascii.asp) | Returns the ASCII value for the specific character |
| [CHAR](https://www.w3schools.com/sql/func_sqlserver_char.asp) | Returns the character based on the ASCII code |
| [CHARINDEX](https://www.w3schools.com/sql/func_sqlserver_charindex.asp) | Returns the position of a substring in a string |
| [CONCAT](https://www.w3schools.com/sql/func_sqlserver_concat.asp) | Adds two or more strings together |
| [Concat with +](https://www.w3schools.com/sql/func_sqlserver_concat_with_plus.asp) | Adds two or more strings together |
| [CONCAT\_WS](https://www.w3schools.com/sql/func_sqlserver_concat_ws.asp) | Adds two or more strings together with a separator |
| [DATALENGTH](https://www.w3schools.com/sql/func_sqlserver_datalength.asp) | Returns the number of bytes used to represent an expression |
| [DIFFERENCE](https://www.w3schools.com/sql/func_sqlserver_difference.asp) | Compares two SOUNDEX values, and returns an integer value |
| [FORMAT](https://www.w3schools.com/sql/func_sqlserver_format.asp) | Formats a value with the specified format |
| [LEFT](https://www.w3schools.com/sql/func_sqlserver_left.asp) | Extracts a number of characters from a string (starting from left) |
| [LEN](https://www.w3schools.com/sql/func_sqlserver_len.asp) | Returns the length of a string |
| [LOWER](https://www.w3schools.com/sql/func_sqlserver_lower.asp) | Converts a string to lower-case |
| [LTRIM](https://www.w3schools.com/sql/func_sqlserver_ltrim.asp) | Removes leading spaces from a string |
| [NCHAR](https://www.w3schools.com/sql/func_sqlserver_nchar.asp) | Returns the Unicode character based on the number code |
| [PATINDEX](https://www.w3schools.com/sql/func_sqlserver_patindex.asp) | Returns the position of a pattern in a string |
| [QUOTENAME](https://www.w3schools.com/sql/func_sqlserver_quotename.asp) | Returns a Unicode string with delimiters added to make the string a valid SQL Server delimited identifier |
| [REPLACE](https://www.w3schools.com/sql/func_sqlserver_replace.asp) | Replaces all occurrences of a substring within a string, with a new substring |
| [REPLICATE](https://www.w3schools.com/sql/func_sqlserver_replicate.asp) | Repeats a string a specified number of times |
| [REVERSE](https://www.w3schools.com/sql/func_sqlserver_reverse.asp) | Reverses a string and returns the result |
| [RIGHT](https://www.w3schools.com/sql/func_sqlserver_right.asp) | Extracts a number of characters from a string (starting from right) |
| [RTRIM](https://www.w3schools.com/sql/func_sqlserver_rtrim.asp) | Removes trailing spaces from a string |
| [SOUNDEX](https://www.w3schools.com/sql/func_sqlserver_soundex.asp) | Returns a four-character code to evaluate the similarity of two strings |
| [SPACE](https://www.w3schools.com/sql/func_sqlserver_space.asp) | Returns a string of the specified number of space characters |
| [STR](https://www.w3schools.com/sql/func_sqlserver_str.asp) | Returns a number as string |
| [STUFF](https://www.w3schools.com/sql/func_sqlserver_stuff.asp) | Deletes a part of a string and then inserts another part into the string, starting at a specified position |
| [SUBSTRING](https://www.w3schools.com/sql/func_sqlserver_substring.asp) | Extracts some characters from a string |
| [TRANSLATE](https://www.w3schools.com/sql/func_sqlserver_translate.asp) | Returns the string from the first argument after the characters specified in the second argument are translated into the characters specified in the third argument. |
| [TRIM](https://www.w3schools.com/sql/func_sqlserver_trim.asp) | Removes leading and trailing spaces (or other specified characters) from a string |
| [UNICODE](https://www.w3schools.com/sql/func_sqlserver_unicode.asp) | Returns the Unicode value for the first character of the input expression |
| [UPPER](https://www.w3schools.com/sql/func_sqlserver_upper.asp) | Converts a string to upper-case |

## SQL Server Math/Numeric Functions

|  |  |
| --- | --- |
| **Function** | **Description** |
| [ABS](https://www.w3schools.com/sql/func_sqlserver_abs.asp) | Returns the absolute value of a number |
| [ACOS](https://www.w3schools.com/sql/func_sqlserver_acos.asp) | Returns the arc cosine of a number |
| [ASIN](https://www.w3schools.com/sql/func_sqlserver_asin.asp) | Returns the arc sine of a number |
| [ATAN](https://www.w3schools.com/sql/func_sqlserver_atan.asp) | Returns the arc tangent of a number |
| [ATN2](https://www.w3schools.com/sql/func_sqlserver_atn2.asp) | Returns the arc tangent of two numbers |
| [AVG](https://www.w3schools.com/sql/func_sqlserver_avg.asp) | Returns the average value of an expression |
| [CEILING](https://www.w3schools.com/sql/func_sqlserver_ceiling.asp) | Returns the smallest integer value that is >= a number |
| [COUNT](https://www.w3schools.com/sql/func_sqlserver_count.asp) | Returns the number of records returned by a select query |
| [COS](https://www.w3schools.com/sql/func_sqlserver_cos.asp) | Returns the cosine of a number |
| [COT](https://www.w3schools.com/sql/func_sqlserver_cot.asp) | Returns the cotangent of a number |
| [DEGREES](https://www.w3schools.com/sql/func_sqlserver_degrees.asp) | Converts a value in radians to degrees |
| [EXP](https://www.w3schools.com/sql/func_sqlserver_exp.asp) | Returns e raised to the power of a specified number |
| [FLOOR](https://www.w3schools.com/sql/func_sqlserver_floor.asp) | Returns the largest integer value that is <= to a number |
| [LOG](https://www.w3schools.com/sql/func_sqlserver_log.asp) | Returns the natural logarithm of a number, or the logarithm of a number to a specified base |
| [LOG10](https://www.w3schools.com/sql/func_sqlserver_log10.asp) | Returns the natural logarithm of a number to base 10 |
| [MAX](https://www.w3schools.com/sql/func_sqlserver_max.asp) | Returns the maximum value in a set of values |
| [MIN](https://www.w3schools.com/sql/func_sqlserver_min.asp) | Returns the minimum value in a set of values |
| [PI](https://www.w3schools.com/sql/func_sqlserver_pi.asp) | Returns the value of PI |
| [POWER](https://www.w3schools.com/sql/func_sqlserver_power.asp) | Returns the value of a number raised to the power of another number |
| [RADIANS](https://www.w3schools.com/sql/func_sqlserver_radians.asp) | Converts a degree value into radians |
| [RAND](https://www.w3schools.com/sql/func_sqlserver_rand.asp) | Returns a random number |
| [ROUND](https://www.w3schools.com/sql/func_sqlserver_round.asp) | Rounds a number to a specified number of decimal places |
| [SIGN](https://www.w3schools.com/sql/func_sqlserver_sign.asp) | Returns the sign of a number |
| [SIN](https://www.w3schools.com/sql/func_sqlserver_sin.asp) | Returns the sine of a number |
| [SQRT](https://www.w3schools.com/sql/func_sqlserver_sqrt.asp) | Returns the square root of a number |
| [SQUARE](https://www.w3schools.com/sql/func_sqlserver_square.asp) | Returns the square of a number |
| [SUM](https://www.w3schools.com/sql/func_sqlserver_sum.asp) | Calculates the sum of a set of values |
| [TAN](https://www.w3schools.com/sql/func_sqlserver_tan.asp) | Returns the tangent of a number |

## SQL Server Date Functions

|  |  |
| --- | --- |
| **Function** | **Description** |
| CURRENT\_TIMESTAMP | Returns the current date and time |
| DATEADD | Adds a time/date interval to a date and then returns the date |
| DATEDIFF | Returns the difference between two dates |
| DATEFROMPARTS | Returns a date from the specified parts (year, month, and day values) |
| DATENAME | Returns a specified part of a date (as string) |
| DATEPART | Returns a specified part of a date (as integer) |
| DAY | Returns the day of the month for a specified date |
| GETDATE | Returns the current database system date and time |
| GETUTCDATE | Returns the current database system UTC date and time |
| ISDATE | Checks an expression and returns 1 if it is a valid date, otherwise 0 |
| MONTH | Returns the month part for a specified date (a number from 1 to 12) |
| SYSDATETIME | Returns the date and time of the SQL Server |
| YEAR | Returns the year part for a specified date |

## SQL Server Advanced Functions

|  |  |
| --- | --- |
| **Function** | **Description** |
| CAST | Converts a value (of any type) into a specified datatype |
| COALESCE | Returns the first non-null value in a list |
| CONVERT | Converts a value (of any type) into a specified datatype |
| CURRENT\_USER | Returns the name of the current user in the SQL Server database |
| IIF | Returns a value if a condition is TRUE, or another value if a condition is FALSE |
| ISNULL | Return a specified value if the expression is NULL, otherwise return the expression |
| ISNUMERIC | Tests whether an expression is numeric |
| NULLIF | Returns NULL if two expressions are equal |
| SESSION\_USER | Returns the name of the current user in the SQL Server database |
| SESSIONPROPERTY | Returns the session settings for a specified option |
| SYSTEM\_USER | Returns the login name for the current user |
| USER\_NAME | Returns the database user name based on the specified id |

## SQL Constraints

* NOT NULL - Ensures that a column cannot have a NULL value
* UNIQUE - Ensures that all values in a column are different
* PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
* FOREIGN KEY - Prevents actions that would destroy links between tables
* CHECK - Ensures that the values in a column satisfies a specific condition
* DEFAULT - Sets a default value for a column if no value is specified
* CREATE INDEX - Used to create and retrieve data from the database very quickly

**CÚ PHÁP CỤ THỂ TỪNG KEYWORD:**

**- Left join**: SELECT \* FROM table1 LEFT JOIN table2 ON condition;

**- Group by**: SELECT column\_name(s) FROM table\_name GROUP BY column\_name;

**- Case**: CASE  
    WHEN condition1 THEN result1  
    WHEN condition2 THEN result2  
    WHEN conditionN THEN resultN  
    ELSE result  
END;

**- ALTER TABLE**: ALTER TABLE table\_name  
 ADD column\_name datatype;

ALTER TABLE table\_name  
RENAME COLUMN old\_name to new\_name;

ALTER TABLE table\_name  
DROP COLUMN column\_name;

**- LIKE**: SELECT column1, column2, ...  
FROM table\_name  
WHERE columnN LIKE pattern;

|  |  |
| --- | --- |
| **LIKE Operator** | **Description** |
| WHERE CustomerName LIKE 'a%' | Finds any values that start with "a" |
| WHERE CustomerName LIKE '%a' | Finds any values that end with "a" |
| WHERE CustomerName LIKE '%or%' | Finds any values that have "or" in any position |
| WHERE CustomerName LIKE '\_r%' | Finds any values that have "r" in the second position |
| WHERE CustomerName LIKE 'a\_%' | Finds any values that start with "a" and are at least 2 characters in length |
| WHERE CustomerName LIKE 'a\_\_%' | Finds any values that start with "a" and are at least 3 characters in length |
| WHERE ContactName LIKE 'a%o' | Finds any values that start with "a" and ends with "o" |

There are two **wildcards** often used in conjunction with the LIKE operator:

* The percent sign (%) represents zero, one, or multiple characters
* The underscore sign (\_) represents one, single character

### Wildcard Characters in SQL Server

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Description** | **Example** |
| % | Represents zero or more characters | bl% finds bl, black, blue, and blob |
| \_ | Represents a single character | h\_t finds hot, hat, and hit |
| [] | Represents any single character within the brackets | h[oa]t finds hot and hat, but not hit |
| ^ | Represents any character not in the brackets | h[^oa]t finds hit, but not hot and hat |
| - | Represents any single character within the specified range | c[a-b]t finds cat and cbt |

**- Group by:**

### GROUP BY Syntax:

SELECT column\_name(s)  
FROM table\_name  
WHERE condition  
GROUP BY column\_name(s)ORDER BY column\_name(s);

Ex:

SELECT COUNT(CustomerID), Country  
FROM Customers  
GROUP BY Country;

**- Having:**

SELECT column\_name(s)  
FROM table\_name  
WHERE condition  
GROUP BY column\_name(s)HAVING conditionORDER BY column\_name(s);

**- View:**

CREATE VIEW view\_name AS  
SELECT column1, column2, ...  
FROM table\_name  
WHERE condition;

## SQL Updating a View:

CREATE OR REPLACE VIEW view\_name AS  
SELECT column1, column2, ...  
FROM table\_name  
WHERE condition;

**- Index: để tăng tốc độ truy vấn**

CREATE INDEX index\_name  
ON table\_name (column1, column2, ...);

**- ALTER**

ALTER TABLE dbo.enroll

NOCHECK CONSTRAINT FK\_\_enroll\_\_studentI\_\_44FF419A;

go

ALTER TABLE [dbo].[TableName] DROP CONSTRAINT [ConstraintName];

ALTER TABLE table\_name  
ADD column\_name datatype;

ALTER TABLE table\_name  
DROP COLUMN column\_name;

ALTER TABLE table\_name  
RENAME COLUMN old\_name to new\_name;